IOP Conference Series: Materials Science and Engineering 2016 vol.158 N1

Decomposition method for zonal resource allocation problems in telecommunication networks

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Abstract

© Published under licence by IOP Publishing Ltd.We consider problems of optimal resource allocation in telecommunication networks. We first give an optimization formulation for the case where the network manager aims to distribute some homogeneous resource (bandwidth) among users of one region with quadratic charge and fee functions and present simple and efficient solution methods. Next, we consider a more general problem for a provider of a wireless communication network divided into zones (clusters) with common capacity constraints. We obtain a convex quadratic optimization problem involving capacity and balance constraints. By using the dual Lagrangian method with respect to the capacity constraint, we suggest to reduce the initial problem to a single-dimensional optimization problem, but calculation of the cost function value leads to independent solution of zonal problems, which coincide with the above single region problem. Some results of computational experiments confirm the applicability of the new methods.

http://dx.doi.org/10.1088/1757-899X/158/1/012054